CALIFORNIA
OCCUPATIONAL GUIDES

EDD Employment Development Department
State of California

DRINKING WATER TREATMENT AND DISTRIBUTION OPERATORS

WASTEWATER TREATMENT PLANT OPERATORS

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INTEREST AREA
REALISTIC

WHAT DOES AN OPERATOR DO?

Most Americans take for granted that the water coming from their tap is safe to drink. Two related occupations are key to ensuring that water used for domestic and commercial purposes is safe. DRINKING WATER TREATMENT AND DISTRIBUTION OPERATORS work with equipment and processes used to clarify, purify, and disinfect surface or ground water for human consumption. WASTEWATER TREATMENT PLANT OPERATORS work with equipment to remove potentially harmful industrial, agricultural, and domestic contaminants from wastewater before it is returned to the environment or recycled. Together with engineers, regulators, scientists, and technicians, Operators are responsible for meeting federal, State, and local agency water quality standards.

The job duties of Operators vary depending on the type and size of plant. In small plants, one Operator may be responsible for all operations including maintenance, source control, laboratory analysis, collection systems, and public relations. In large plants, Operators may perform a small but complex segment of the processing operation. The skilled work performed by Operators involves the operation, control, and maintenance of electric motors, valves, pumps, chemical feeding devices, and mixers. They use equipment to regulate the flow of untreated water into treatment plants and the flow of treated water out of these plants. They monitor flow rates, water level and distribution, and pressure levels. Operators perform chemical or biological tests on water samples. They add specified amounts of chlorine, ammonia, lime, and other chemicals to disinfect and clarify water. They also operate and monitor process units treating the solids removed from wastewater as well as the foul air generated from treatment. Other duties include daily reading and logging of meters, gauges, and indicators. They prepare required reports based on gauge readings, test results, and water volume processed. Operators inspect equipment and perform routine maintenance. Increasingly, they use computers and automated equipment in their work.

Drinking Water and Distribution Operators and Wastewater Treatment Operators perform the following tasks:

- Operate and adjust equipment controls to purify and clarify water; process and treat wastewater, air, and solids; recycle or discharge treated water; and generate power.
- Inspect equipment and monitor operating conditions, meters, and gauges to determine load requirements and detect malfunctions.

- Add chemicals, such as ammonia, chlorine, and lime, to purify and disinfect water and chemicals, such as ferric chloride, peroxide, and polymers to enhance treatment of wastewater.
- Collect and test water and wastewater samples, using test equipment and color analysis standards.
- Record operational and laboratory data, observations of processes, and meter and gauge readings on specified forms.
- Clean and maintain tanks, basins, and filter beds, using hand tools and power tools.
- Maintain, repair, and lubricate equipment, using hand tools and power tools.
- Direct and coordinate plant workers engaged in routine operations and maintenance activities.

WHAT SKILLS ARE IMPORTANT?

Important skills, knowledge, and abilities for both types of Operators include:

- Biology – Basic knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.
- Microbiology – Basic knowledge of micro-organisms used in wastewater treatment, such as anaerobic digestion and activated sludge.
- Chemistry – Basic knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interaction, danger signs, production techniques, and disposal methods.
- Physics – Basic knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, materials, and atmospheric dynamics, and mechanical and electrical processes.
- Problem Sensitivity – The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- Near Vision – The ability to see details at close range (within a few feet of the observer).
- Operation and Control – Controlling operations of equipment or systems manually.
- Troubleshooting – Determining causes of operating errors and deciding what to do about it.
- Computers – Ability to use software to control automated equipment or process units and to communicate with co-workers.

Operators need mechanical aptitude and the ability to read and understand charts and graphs and carry out oral and written instructions. They must have the initiative to make decisions within specified standards under minimum supervision. They must be able to work both well with others and independently.

WHAT'S THE WORK ENVIRONMENT?

The work is performed both indoors and outdoors in all types of weather. Employers provide necessary personal protective equipment (PPE) and training on its appropriate use. Items often provided as PPE include rainwear, protective clothing, uniforms, hard hats, earplugs or muffs, gloves (leather, rubber, latex), non-slip-soled boots (steel-toe and shank possible), safety glasses, goggles, and face shields. Operators may be exposed to noise from electrical motors and pumps as well as unpleasant odors. However, modern plants have developed safety systems to prevent exposure to hazardous chemicals and chlorine fumes. Water and wastewater treatment plants must be kept clean and orderly to minimize potential hazards from electric shock, moving machinery, and slippery walkways.

Union Membership

Operators can become members of various unions such as Stationary Engineers, International Brotherhood of Electrical Workers, or the International Union of Operating Engineers. According to national data in the *Career Guide to Industries* almost a third of workers in utilities belong to unions, which is more than double the union membership rate for all other industries.

WHAT'S THE CALIFORNIA JOB OUTLOOK?

The following information is from the occupational projections produced by the Employment Development Department (EDD) Labor Market Information Division (LMID) and represents the broad occupational group Water and Liquid Waste Treatment Plant and System Operators which includes Drinking Water Treatment and Distribution Operators and Wastewater Treatment Plant Operators:

Water and Liquid Waste Treatment Plant and System Operators

Estimated number of workers in 2002:	7,600
Estimated number of workers in 2012:	9,200
Projected Growth 2002-2012:	21.1%
Est. openings due to separations by 2012:	2,600

These figures do not include self-employment.

This occupation will grow at faster than average rate compared to all occupations in California. There will be an estimated total of 5,100 job opportunities in this occupation from 2002 through 2012 or an average of 510 jobs a year. Some of the opportunities will come from growth and the rest from replacing those who retire or otherwise permanently leave the field. The industry association, California Water Environment Association (CWEA), reports the occupation is affected by large numbers of retirements creating a need for new Operators.

The Department of Health Services reports 13,000 currently licensed Drinking Water Treatment and Distribution Operators and the State Water Resources Control Board (SWRCB) shows 5,600 licensed Wastewater Treatment Plant Operators.

Trends

Federal regulation to ensure clean water for a growing population will increase employment in water and wastewater treatment. Water and wastewater treatment are the only segments of the utilities industry experiencing employment growth. In addition to protecting water supplies from environmental contaminants, water utilities now employ security procedures to protect water from deliberate contamination. More opportunities may result from use of treated wastewater for irrigation and groundwater recharge.

WHAT DOES THE JOB PAY?

California Earnings

The following information is from the Occupational Employment Statistics Survey of Employers by EDD/LMID and represents the broad occupational group Water and Liquid Waste Treatment Plant and System Operators which includes Drinking Water Treatment and Distribution Operators and Wastewater Treatment Plant Operators:

Water and Liquid Waste Treatment Plant and System Operators 2005 Wages

Hourly wages range from	$18.59 to $28.22
Average hourly wage	$23.44
Average annual wage	$48,750

These figures do not include self-employment.

Hours

Operators can work stationary or rotating shifts, weekends included, and are paid a shift differential for swing or graveyard shifts. Shifts can vary from 8-hour to 12-hour slots. Overtime hours may be necessary when emergencies occur and are generally paid at time and one-half or double time rates.

Benefits

Benefits include vacations, holidays and sick leave; health, dental and vision insurance; and retirement plans.

HOW DO I PREPARE FOR THE JOB?

Education and Training

Entrance requirements vary somewhat, depending on the employer. Some employers require applicants to have an associate's or bachelor's degree in water treatment technology. Other employers hire applicants who have a high school education or equivalent. Many employers hire inexperienced but highly motivated applicants and train them on-the-job. Some hire only experienced, certified Operators. In some areas of the State, the union and government may offer a joint water treatment operators apprenticeship program that normally takes four and one-half

years. The California Training and Education Programs lists 17 training institutions offering wastewater treatment programs in California—community colleges, unions, or private schools. Trainees receive intensive on-the-job training and attend technical classes after work. High school students can begin preparing for this type of work by taking math and science classes. California State University, Sacramento Office of Water Programs offers distance-learning Operator training to assist small communities train Operators and improve performance.

Professional organizations (see list in Other Sources of Information) provide technical training at seminars, conferences, and workshops and provide reference materials such as the *Standard Methods for Water and Wastewater Laboratory Analysis*. Local chapters provide on-site tours, technical speakers, and other interactive learning opportunities. Training on specific topics, such as preparation for State exams, math, and various process control issues is provided at facilities or agency locations.

Licensing and Certification

The Department of Health Services (DHS) certifies Drinking Water Treatment and Distribution Operators. Certification depends upon the class of the water facility—either a distribution system or a treatment facility. There are five levels of certification for water facilities, water treatment operators, and distribution operators. Applicants must meet experience requirement and pass an examination for each of the five levels of certification. Thus a Grade T3 Water Treatment Plant Operator is certified to treat water, and a Grade D3 Water Treatment Plant Operator is certified for water distribution system operation. Operators may be cross-certified for both treatment and distribution Operator tasks.

The State Water Resources Control Board (SWRCB) certifies Wastewater Treatment Plant Operators. Certification requirements for various positions (Operator, Supervisor, Chief Plant Operator) depend upon the classification of the facility related to the treatment levels and flow capacities. There are five levels of certification for Wastewater Operators.

The certification process requires both types of Operators to have specific amounts of on-the-job training, complete training courses, and pass a competency examination for each grade level of certification—Grades I through V. Operators with no prior experience generally begin as Operators-in-training and work under direct supervision of certified Operators. As a condition of continued employment, trainees are required to obtain a Grade I certificate within two years. Most employers require a valid driver's license.

Continuing Education

Certification renewal may require completion of continuing education units (CEUs) or contact hours. The number of contact hours required depends on the certificate grade. Check with DHS and the SWRCB for specific requirements.

HOW DO I FIND THE JOB?

Both types of Operators are needed in communities or facilities large enough to have a water system and treatment plant. Most employers are public utilities, cities, and counties. Search in the government section of the phone book for public utilities using terms such as Sanitation Agency or District (note that Sanitation can also refer to solids waste or trash disposal), Wastewater Authority, or Water Utility or District. A few Operators work in national parks or private campgrounds. Others work in industries required to treat their own wastewater. Some Operators work as independent contractors.

Applying directly to employers remains one of the most effective job search methods. Search these **yellow page** listings for listings of private firms:

- Engineers – Water Supply
- Environmental and Ecological Services
- Laboratories – Analytical
- Water Companies – Utility
- Water Filtration and Purification Equipment
- Water Treatment Equipment, Services and Supplies

Search classified ads under these headings:

- Water Treatment Operator
- Wastewater Treatment Operator

The following Internet resources can be helpful to the job search process:

America's Career InfoNet
www.acinet.org

America's Job Bank
www.ajb.dni.us

CalJOBS℠
www.caljobs.ca.gov

Job Search and Resume Writing
www.worksmart.ca.gov/success_tips_menu.html

Local Job Service Offices
www.edd.ca.gov/jsrep/jsloc.htm

Occupational Information Network (O*NET) Online
http://online.onetcenter.org

One-Stop Career Centers List
www.edd.ca.gov/ONE-STOP/pic.htm

For statewide and local projections, wages, employers by county, and other occupational information go to www.labormarketinfo.edd.ca.gov and select *Find an Occupation Profile*.

Professional organizations provide networking opportunities as well as post job openings on their Web sites. Attending conferences, seminars, and workshops can put one in contact with already employed Operators who know of potential job openings. The daily e-bulletin, *California Water News*, posts job openings in the field.

CWEA Job Bank
www.cwea.org/e-bulletin/jobs.html

California Water News
www.bcwaternews.com

WHERE CAN THE JOB LEAD?

Drinking Water Treatment and Distribution Operators and Wastewater Treatment Plant Operators require specific amounts of on-the-job training, completion of training courses, and passing a competency examination for each certification level (Grades I through V). Each grade level brings more responsibility and a higher salary. Other higher-level positions are Senior or Lead Plant Operator, Operations Supervisor, Chief Plant Operator, Operations Manager, or Superintendent. Once Grade Level V is obtained, the next step would be a management position in public works or other agency administration. This job can also lead to positions in other states or countries, or other types of positions with regulatory agencies, contracting companies, or consulting firms.

OTHER SOURCES OF INFORMATION

Association of Boards of Certification
(ABC for Other States)
208 Fifth Street
Ames, IA 50010-6529
(515) 232-3623
www.abccert.org

California/Nevada Section American Water Works Association (CA-NV AWWA)
Certification Program
10574 Acacia Street, Suite D6
Rancho Cucamonga, CA 91730
(909) 481-7200
www.ca-nv-awwa.org

California Groundwater Association (CGA)
P.O. Box 14369
Santa Rosa, CA 95402-6369
(707) 578-4408
www.groundh2o.org

California Rural Water Association (CRWA)
1112 I Street, Suite 200
Sacramento, CA 95814
(800) 833-0322
www.calruralwater.org

California State Water Resources Control Board (SWRCB)
Office of Operator Certification
P.O. Box 944212
Sacramento, CA 94244-2120
(916) 341-5639
www.swrcb.ca.gov/cwphome/opcert

California Water Environment Association Technical Certification Program (CWEA TCP)
7677 Oakport Street, Suite 525
Oakland, CA 94621-1944
(510) 382-7800
www.cwea.org

California Water Treatment Operator Certification Department of Health Services
Operator Certification Program
P.O. Box 997413, MS#7417
Sacramento, CA 95899-7413
(916) 449-5611
www.dhs.ca.gov/ps/ddwem/technical/certification/opcert.html

Office of Water Programs
California State University, Sacramento
6000 J Street
Sacramento, CA 95819-6025
(916) 278-6142
www.owp.csus.edu

Water Environment Federation
601 Wythe Street
Alexandria, VA 22314-1994
(800) 666-0206 or (703) 684-2452
www.wef.org/careerpaths

CA Division of Apprenticeship Standards
For the closest district office, visit
www.dir.ca.gov/DAS/das.html

RELATED OCCUPATIONAL GUIDES

Laboratory Assistants and Technicians (Except Health)	No. 201
Stationary Engineers and Boiler Operators	No. 234
Power Plant Operators	No. 474

OCCUPATIONAL CODE REFERENCES

SOC *(Standard Occupational Classification)*

Water and Liquid Waste Treatment Plant and System Operators	51-8031

O*NET *(Occupational Information Network)*

Water and Liquid Waste Treatment Plant and System Operators	51-8031.00

OES *(Occupational Employment Statistics)*

Water and Liquid Waste Treatment Plant and System Operators	95002